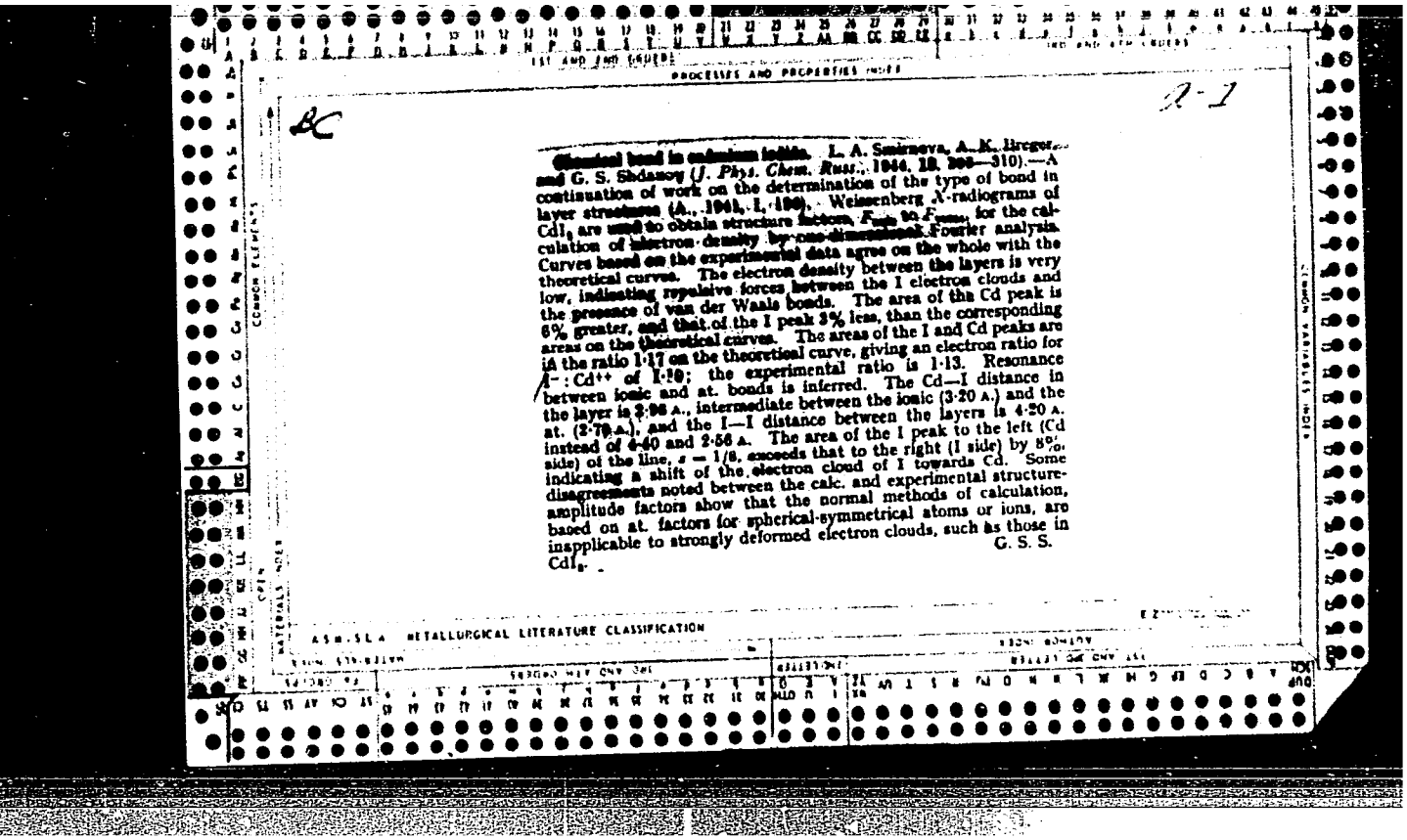
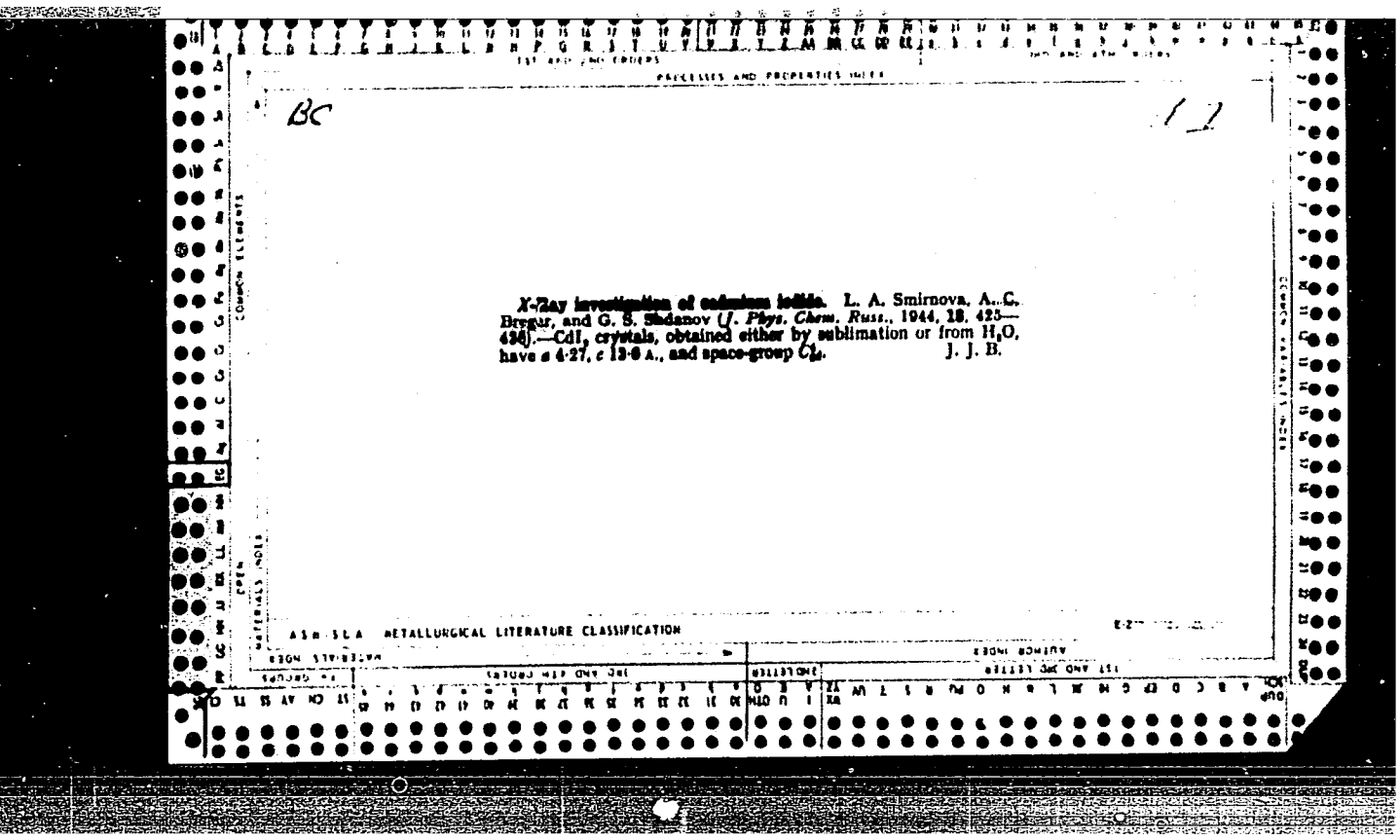


PROCESSES AND PROPERTIES INDEX

X-1

Chemical bond in cadmium iodide. L. A. Smirnova, A. K. Breger, and G. S. Shdanov (*J. Phys. Chem. Russ.*, 1944, 18, 303—310).—A continuation of work on the determination of the type of bond in layer structures (A., 1941, I, 199). Weissenberg X-radiograms of CdI_2 are used to obtain structure factors, F_{001} to F_{0006}, for the calculation of electron-density by one-dimensional Fourier analysis. Curves based on the experimental data agree on the whole with the theoretical curves. The electron density between the layers is very low, indicating repulsive forces between the I electron clouds and the presence of van der Waals bonds. The area of the Cd peak is 6% greater, and that of the I peak 3% less, than the corresponding areas on the theoretical curves. The areas of the I and Cd peaks are in the ratio 1·17 on the theoretical curve, giving an electron ratio for I^- : Cd^{++} of 1·99; the experimental ratio is 1·13. Resonance between ionic and at. bonds is inferred. The Cd—I distance in the layer is 2·98 A., intermediate between the ionic (3·20 A.) and the at. (2·79 A.), and the I—I distance between the layers is 4·20 A. instead of 4·40 and 2·56 A. The area of the I peak to the left (Cd side) of the line, $s = 1/8$, exceeds that to the right (I side) by 8%, indicating a shift of the electron cloud of I towards Cd. Some disagreements noted between the calc. and experimental structure-amplitude factors show that the normal methods of calculation, based on at. factors for spherical-symmetrical atoms or ions, are inapplicable to strongly deformed electron clouds, such as those in CdI_2. G. S. S.

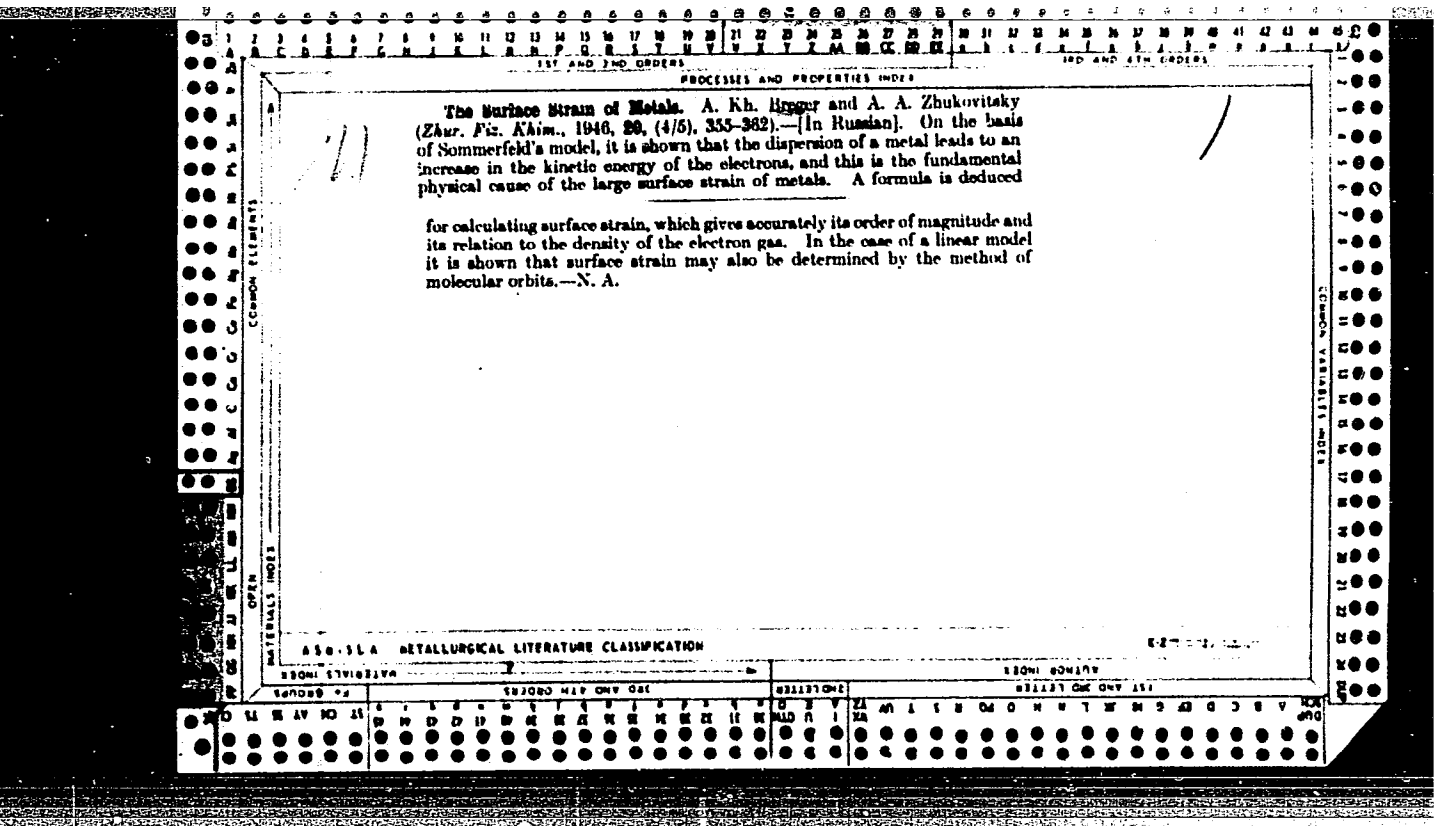
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



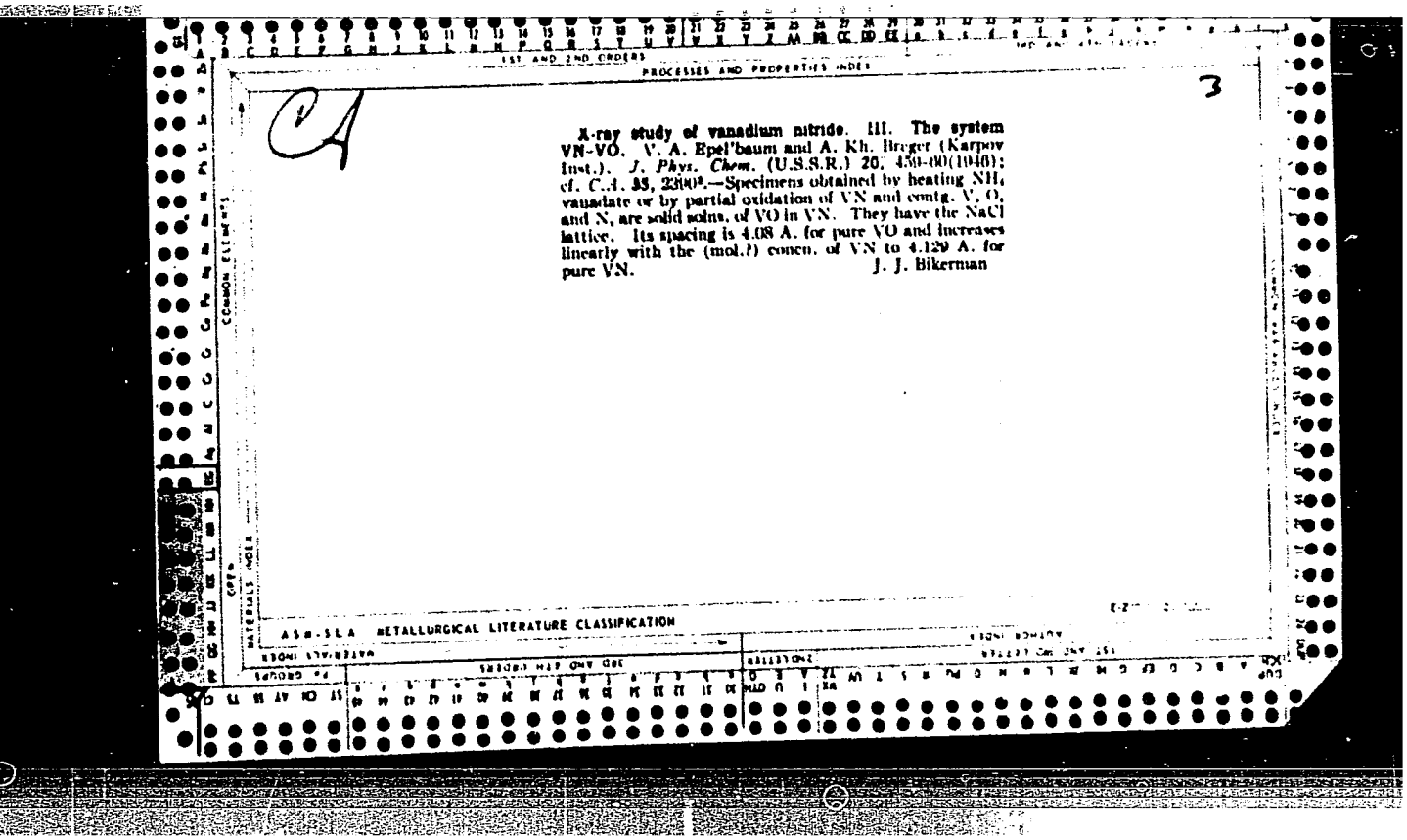
BC

1 1

X-Ray investigation of cadmium iodide. L. A. Smirnova, A. G. Bregar, and G. S. Shdanov (*J. Phys. Chem. Russ.*, 1944, 18, 425—436).—CdI$_2$ crystals, obtained either by sublimation or from H_2O, have a 4·27, c 13·6 A., and space-group C_{3i}^1. J. J. B.



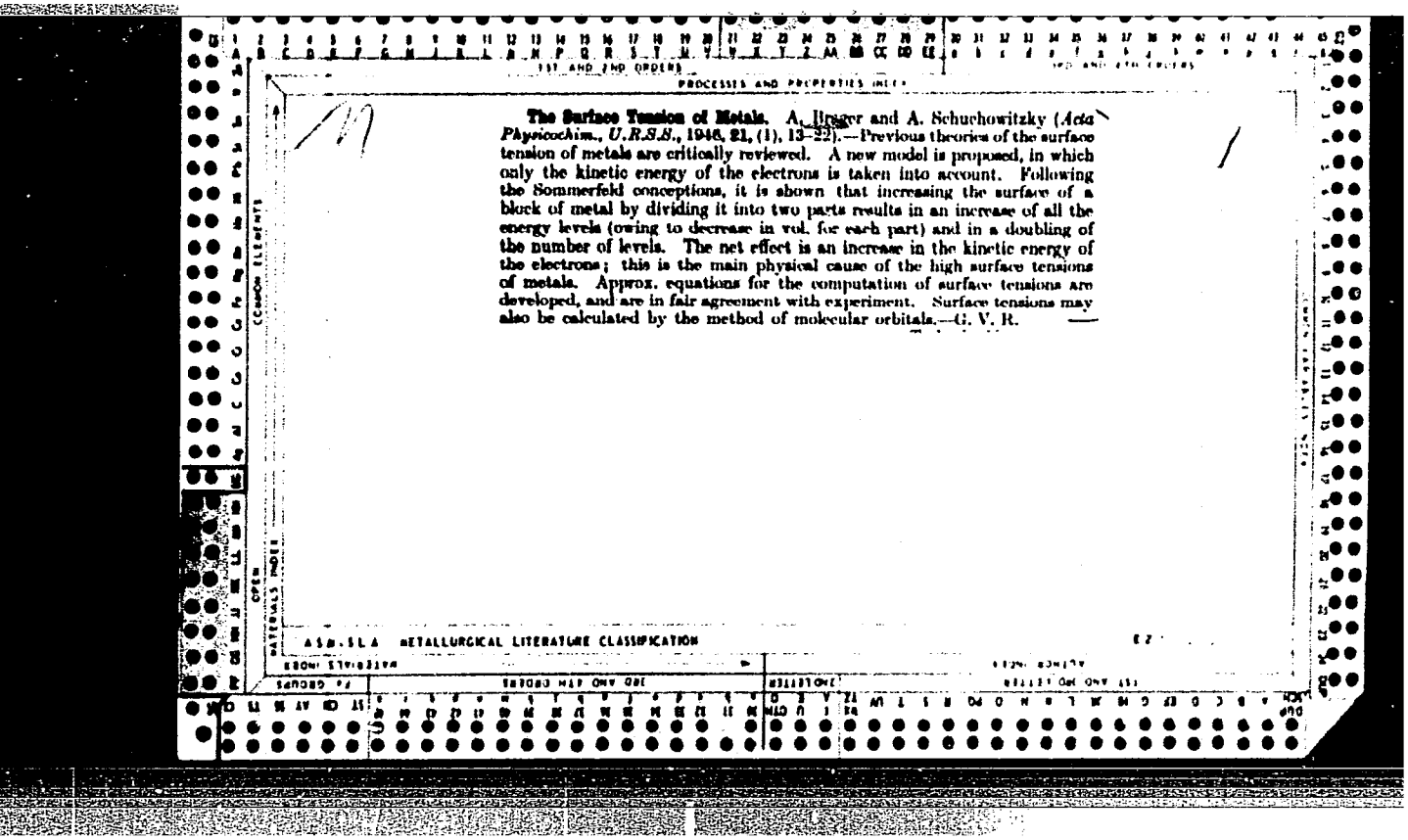
The Surface Strain of Metals. A. Kh. Breger and A. A. Zhukovitsky (*Zhur. Fiz. Khim.*, 1946, **20**, (4/5), 355–362).—[In Russian]. On the basis of Sommerfeld's model, it is shown that the dispersion of a metal leads to an increase in the kinetic energy of the electrons, and this is the fundamental physical cause of the large surface strain of metals. A formula is deduced for calculating surface strain, which gives accurately its order of magnitude and its relation to the density of the electron gas. In the case of a linear model it is shown that surface strain may also be determined by the method of molecular orbits.—N. A.



CA

3

X-ray study of vanadium nitride. III. **The system VN-VO.** V. A. Epel'baum and A. Kh. Breger (Karpov Inst.). *J. Phys. Chem.* (U.S.S.R.) 20, 439-40(1946); cf. *C.A.* **35**, 2309⁹.—Specimens obtained by heating NH_4 vanadate or by partial oxidation of VN and cmtg. V, O, and N, are solid solns. of VO in VN. They have the NaCl lattice. Its spacing is 4.08 A. for pure VO and increases linearly with the (mol.?) concn. of VN to 4.129 A. for pure VN. J. J. Bikerman



The Surface Tension of Metals. A. Ilinger and A. Schuchowitzky (*Acta Physicochim., U.R.S.S.*, 1948, **21**, (1), 13–22).—Previous theories of the surface tension of metals are critically reviewed. A new model is proposed, in which only the kinetic energy of the electrons is taken into account. Following the Sommerfeld conceptions, it is shown that increasing the surface of a block of metal by dividing it into two parts results in an increase of all the energy levels (owing to decrease in vol. for each part) and in a doubling of the number of levels. The net effect is an increase in the kinetic energy of the electrons; this is the main physical cause of the high surface tensions of metals. Approx. equations for the computation of surface tensions are developed, and are in fair agreement with experiment. Surface tensions may also be calculated by the method of molecular orbitals.—G. V. R.

BRAGER, A.

USSR/Chemistry - Vanadium Nitride Jul/Aug 1946
Chemistry - X-Ray Study

"An X-Ray Examination of Vanadium Nitride. III. The System VN--VO," V. Epelbaum, A. Brager, X-Ray Lab and Lab of Solid Compounds, Karpov Inst Phys Chem, Moscow, 3 pp

"Acta Physicochimica URSS" V ol XXI, No 4

Shows unit cube edge of solid solutions VN--VO changes linearly with the concentration of the compounds from the unite cube edge of pure vanadium nitride (4.129 A) down to that of pure vanadium oxide (~ 4.08 A). Recieved 15 Aug 1945

PA 52T9

BRAGER, A. PA 54T84

USSR/Physics Nov/Dec 1946
Specific Heat

"The Superficial Density of Specific Heat," A. Brager, A. Zhukhovitskiy, 18 pp

"Acta Physicochimica URSS" Vol XXI, No 6

Investigates influence of surface on thermal vibrations of a solid following Debye's approximation which results in a calculation of superficial density of specific heats of solids. Considerable difference between specific heat of graphite and that of activated charcoal, observed by Simon and Swain, explained on basis of theory elaborated in the paper. Received, 11 May 1946.

[redacted] 54T84

BREGER, A. Kh.

PA 14T96

USSR/Chemistry - Atoms Apr 1947
Chemistry - Adsorption

"A Possible Mechanism of Interaction Between Adsorbed Atoms," A. Kh. Breger, A. A. Zhukhovitskiy, 7 pp

"Zhur Fiz Khim" Vol XXI, No 4, 422-430

Largely mathematical discussion demonstrating the possibility of the existence of far reaching forces among adsorbed atoms, the emergence of these forces in connection with a change in the energy of the electrodes of the adsorbent, conditioned by the fact that the adsorbed atom "excludes" a definite area from resonance and thus changes the nature of the movement of the remaining adsorbent electrodes.

14T96

BREGER, A. Kh.

PA 18T92

USSR/Chemistry - Vibrations May 1947
Chemistry - Energy

"The Independence of Surface Excess of Energy of Thermal Vibrations on Forms of Bodies," A. Kh. Breger, 6 pp

"Zhur Fiz Khim" Vol XXI, No 5, 623-629

Experiments resulted in showing errors in work conducted by Frenkel' and Gubanov in computing the energy of vibration variations with calculation of the influence on the surface. Published in Moscow on 20 Oct 1946.

18T92

PA 247102

BREGER, A. Kh.

Sep 1947

USSR/Physics
Radiation - Pressure
Radiation, Black Body

"Radiational Surface Pressure," A. Kh. Breger, 3 pp

"Zhur Fiziches Khim" Vol XXI, No 9, 1087-93

The author discusses the results obtained from investigating the energy of electromagnetic fluctuation allowing for the individual surfaces of a body according to a method which was first introduced by Zaukhovitskiy. He showed that in the case of an absolute black body, such an accounting leads to the calculation of the positive radiational pressure. These experiments were conducted at Moscow and much

247102

Sep 1947

USSR/Physics (Contd)

use was made of data previously collected by A. A. Zaukhovitskiy.

247102

BREGER, A. KH.

USSR/Physics
Electron
Surface Tension
Aug 48

"Eotvos's (Eotvos') Laws and the Surface Concentration of the Specific Heat of an Electron Gas," A. Kh. Breger, 5 pp

"Zhur Fiz Khim" Vol XXII, No 8, 920-924

Studies temperature relation of the surface concentration of the energy of an electron gas, showing direct relationship between temperature coefficient of surface tension of metals and temperature coefficient of surface concentration.

55/49T90

USSR/Physics (Contd) Aug 48

In contrast to Eotvos's laws, relationships of surface tension of metals to temperature are expressed as quadratic functions. Also applies an earlier theory of surface concentration of the specific heat of solids to metals. Submitted 25 Oct 47.

55/49T90

BREGER, A.Kh.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1522
AUTHOR BREGER,A.CH., BELYNSKIJ,V.A., PROKUBIN,S.D.
TITLE An Apparatus for Radiochemical Investigations by means of a Co^{60} Gamma Radiation Source with the Activity of 280 Curie.
PERIODICAL Atomnaja Energija, 1, fasc. 4, 131-138 (1956)
Issued: 19.10.1956

Here such an apparatus, which is in operation, is described. The advantages offered by such radiation sources are pointed out. At first such devices for radiochemical investigations by means of Co^{60}, as are mentioned in literature, are discussed.
The apparatus described must satisfy the following conditions:
A) Investigations to be carried out with a dose of 20-50 roentgen/sec or up to 100 roentgen/sec for a volume of the object to be irradiated of up to 1 l or from 20 to 30 milliliters.
B) It must be possible to introduce samples and devices easily into the chamber without any additional irradiation of the operating staff.
C) Physical and chemical experimental conditions and processes should be under remote control and observation without the object being moved (shaken).
D) Simple and reliable remote control of the motions of the radiation source and the container, and blocking of all dangerous operations.
E) Possibility of charging the container with the γ-radiation source and of exchanging the container on the spot.
F) It must be possible to erect the apparatus in buildings and premises of the

usual type.

G) This model is to serve as a model for stronger apparatus, (to be used by the same institute). The apparatus described here had already been in operation for one year when this paper was written, and more than 500 experiments had been carried out with it, which proves its serviceability.

The apparatus K 300 consists of the following principal parts: γ-radiation source, container, operation chamber, concrete block, charging mechanism, control desk. The apparatus is mounted in a cabin (area 9 m^2, height 3 m) the walls of which are of sheet iron.

Carrying out work with the apparatus described: The object to be irradiated is introduced into the apparatus by means of one of the charging devices, on which occasion the γ-radiation source is in the closed container. All further operations (opening of the container, placing the container with the radiation source under the operating chamber and transferring the source from the container into the operating chamber) can be carried out only by means of remote control while the cabin door is closed, because of a blocking mechanism.

There follows a short description of the principal parts of the apparatus, with which it is possible to irradiate various objects with a volume of from 30 to 800 cm^3 for 120 to 30 Roentgen per second.

INSTITUTION:

3525

INSTALLATION FOR RADIOCHEMICAL INVESTIGATIONS WITH A Co^{60} SOURCE OF GAMMA RADIATION WITH AN ACTIVITY OF 280 g-equiv. RADIUM. A. Kh. Breger, V. A. Belynsky, and S. D. Prokudin. Soviet J. Atomic Energy 4, 587-95(1956).

A description is given of an installation in use for irradiation of substances by Co^{60} γ radiation (280 g-equiv. radium) for radiochemical investigations with the use of a standard Co^{60} preparation. The apparatus was developed on the basis of a critical examination of installations described in the literature which are used for such investigations, and in conformity with the demands made upon modern radiochemical experimental work. The design of the apparatus is such as to permit various physicochemical measurements during irradiation, under safe conditions for the operators. The dose rate in the irradiation of objects 20 to 30 cc in volume is 120 r/second, and for objects up to 800 cc in volume, 30 r/second. (auth)

BREGER, A. Kh.

"The Sources of Nuclear Radiations."

report presented at Scientific Conference at the Inst. for Physical Chemistry imeni L. Ya. Karpov, Acad. Sci. USSR, Nov 1957.

BREGER, A. Kh., BELINSKIY, V. A., KARPOV, V. L., PROKUDIN, S. D., OSIPOV, V. B.

"Strong Co^{60} gamma ray source for radiation chemical research (21000 g. equiv. of radium)," a paper submitted at the International Conference on Radioisotopes in Scientific Research, Paris, 9-20 Sep 57.

BREGER, A. Kh.

78-3-30/35

AUTHORS: Breger, A. Kh, Ormont, B. F., Kutsev, V. S., Viting, B. I. and Chapyzhnikov, B. A.

TITLE: The Use of Brake Radiation of a Betatron for Characterizing the Oxygen Content of Semi-Conductors and Metallic Materials (Particularly Titanium Oxy-Carbides). (Ob ispol'zovanii tormoznogo izlucheniya betatrona dlya kharakteristiki soderzhaniya kisloroda v poluprovodnikovykh i metallicheskikh materialakh (v chastnosti, v oksikarbidakh titana)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1957, Vol.II, Nr.3, pp. 696-699. (USSR)

ABSTRACT: This is a preliminary report on the development of a radio-activational method for determining non-metallic impurities in metals and semi-conductors. The possibility of determining oxygen in the system Ti-C-O from the reaction $O^{16}(\gamma,n)O^{15}$ with the use of brake radiation from a betatron has been demonstrated. Preliminary calibration curves for preparations with not less than 1% oxygen have been constructed. The method is non-destructive and requires about 10 min per

Card 1/2

The Use of Brake Radiation of a Betatron for Characterizing the Oxygen Content of Semi-Conductors and Metallic Materials...

determination. There is 1 figure and 7 references, of which 4 are Slavic.

ASSOCIATION: The Physico-Chemical Institute imeni L. Ya. Karpov. (Fiziko-khimicheskiy Institut im. L. Ya. Karpova.)

SUBMITTED: August 15, 1956.

AVAILABLE: Library of Congress.

Card 2/2

BREGER, A. Kh.

"On the Nature of Surface Tension of Metals."

Hydrodynamics of Molten Metals (Gidrodinamika rasplavlennykh metalov; trudy pervogo soveshchaniia po teorii liteinykh protsessov. Moskva, Izd-vo Akad. nauk SSSR, 1958, 257 pp.

(Proceedings of the First Conference on the Theory of Casting Processes)

Physico-Chemical Institute imeni "L. A. Karpov"

BKEGER, A. Kh.

PHASE I BOOK EXPLOITATION SOV/1297

Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya po primeneniyu radioaktivnykh i stabil'nykh izotopov i izlucheniy v narodnom khozyaystve i nauke, Moscow, 1957

Polucheniye izotopov. Mashchnyye gamma-ustanovki. Radiometriya i dozimetriya; trudy konferentsii... (Isotope Production. High-energy Gamma-Radiation Facilities. Radiometry and Dosimetry; Transactions of the All-Union Conference on the Use of Radioactive and Stable Isotopes and Radiation in the National Economy and Science.) Moscow, Izd-vo AN SSSR, 1958. 293 p.

Sponsoring Agency: Akademiya nauk SSSR; Otdeleniye upravleniye po ispol'zovaniyu atomnoy energii SSSR.

Editorial Board: Prolov, Yu.S. (Resp. Ed.); Zhavoronkov, N.M. (Deputy Resp. Ed.); Aglintsev, K.K.; Alekseyev, B.A.; Bochkarev, V.V., Lebedinskiy, N.I., Malkov, P.P., Sinitsyn, V.I., and Popova, G.L. (Secretary); Tech. Ed.: Novichkov, M.D.

PURPOSE: This collection is published for scientists, technologists, persons engaged in medicine or medical research, and others concerned with the production and/or use of radioactive and stable isotopes and radiation.

COVERAGE: Thirty-eight reports are included in this collection under three main subject divisions: 1) production of isotopes 2) high-energy gamma-radiation facilities, and 3) radiometry and dosimetry.

TABLE OF CONTENTS:

PART I. PRODUCTION OF ISOTOPES

Prolov, Yu.S., V.V. Bochkarev, and Ye.Ye. Kulish. Development of Isotope Production in the Soviet Union 5
This report is a general survey of production methods, apparatus, raw materials, applications, investigations and future prospects for radio isotopes in the Soviet Union.

Card 2/12

Bregger, A. Kh., V.A. Belyakiy, V.L. Karpov, S.D. Prokudin and V.S. Ostrovskiy. Facility for Radiation-Chemical Research Employing Co^{60} Gamma-Radiation Source With an Activity of 21,000 g-v of Radium 182
A K-20000 Co^{60} gamma-radiation source, cited as the most powerful in the world according to available data, is described and basic parameters tabulated. The unit, is provided with a control panel and a system of periodic observation and is capable of 1200 r/sec dosage per 0.4 liters and ~100 r/sec per 100 liters volume. Working chamber capacity is ~300 liters. The source, comprising 56 standard Co^{60} preparations, the authors state, is safe for attending personnel owing to a "dry" method especially developed for this unit.

Card 8/12

BREGER, A. KH. AND RYABUKHIN, YU. S.

"Modeling Isotope Sources of Radiation for Potential Industrial Radiation-chemical Installations.I. Investigation of Dosage Fields in the Operational chamber of Apparatus K-1400"

Truly Transactions of the First Conference on Radioaction Chemistry, Moscow, Izd-vo AN SSSR, 1958. 330pp.
Conference -25-30 March 1957, Moscow

SOV/81-59-16-56983

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 16, p 145 (USSR)

AUTHOR: Breger, A.Kh.

TITLE: Sources of Nuclear Radiations for Radiation-Chemical Investigations

PERIODICAL: V sb.: Probl. fiz.khimii. Nr 1. Moscow, Goskhimizdat, 1958, pp 61-72

ABSTRACT: The development of the sources of nuclear radiations for radiation-chemical investigations in connection with the development of radiational-chemistry is considered and the perspectives of their further development are pointed out. The complex of sources is described which have been developed in the Physical-Chemical Institute imeni Karpov and which are of different type (isotope sources, accelerators) and energy (280 - 60,000 g-equ Ra for isotope sources and 0.180 - 20 Mev for accelerators). A detailed description is given as well as the plans of the isotope installation K-20,000 with a Co^{60}-source of γ-radiation with an activity of 21,000 g-equ Ra corresponding to the principal demands of modern radiation-chemical investigations.

Z. Sokolova.

Card 1/1

SOV/81-59-21-74749

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 21, p 158 (USSR)

AUTHORS: Breger, A.Kh., Belynskiy, V.A., Karpov, V.L., Prokudin, S.D.

TITLE: Installations for Radiochemical Investigations. 19 Comm. II. An Installation Ensuring a Dose Intensity of up to 300 Roentgen/sec in a Volume of 30 ml and of up to 100 Roentgen/sec in 1 l With a Co^{60} γ-Radiation Source With an Intensity of 1,400 g-equ Radium

PERIODICAL: V sb.: Deystviye ioniziruyushchikh izlucheniy na neorgan. i organ. sistemy. Moscow, AS USSR, 1958, pp 379 - 394

ABSTRACT: This is a review of installations for irradiation with the γ-radiation of Co^{60} in radiochemical investigations as well as a description of the K—1400 installation of the Physical-Chemical Institute imeni Karpov with a Co^{60} γ-radiation source with an intensity of 1,440 g-equ Ra ensuring a dose intensity of 300 roentgen/sec in a volume of 30 ml and 100 roentgen/sec in 1 l. The installation has been developed based on the requirements of the modern radiochemical experiment; it is equipped

Card 1/2

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206820016-6"

SOV/81-59-21-74749

Installations for Radiochemical Investigations. Comm. II. An Installation Ensuring a Dose Intensity of up to 300 Roentgen/sec in a Volume of 30 ml and ofup to 100 Roentgen/sec in 1 l With a Co^{60} γ-Radiation Source With an Intensity of 1,400 g-equ Radium

with a desk for remote control and observation of the conditions of the experiment and the processes taking place in the objects of investigation during irradiation. There are 22 references. Communication I see RZhKhim, 1957, Nr 12, 41580.

Z. Sokolova

Card 2/2

SOV/156-58-4-39/49

AUTHORS: Polevodov, A. P., Nikashina, V. A., Gordiyevskiy, A. V., Senyavin, M. M., Breger, A. Kh.

TITLE: The Radio-Chemical Stability of the Ion Exchange Resins Under the Influence of γ- and β-Rays on the Cationites (Radiatsionno-khimicheskaya ustoychivost' ionoobmennykh smol. Deystviye γ- i β-izlucheniy na kationity)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 761-764 (USSR)

ABSTRACT: The radio-chemical stability of the cationites KU-2, KU-1, SBS, RF, KB-4 under the influence of γ- and β-rays was investigated. Cobalt^{60} was used as γ-radiator. In the irradiation the capacity of the cationites is reduced. The chemical stability is reduced by the irradiation and the capability of swelling of the resins KU-2 and KB-4 decreases, whereas it increases with the resins KU-1 and RF. The quantity of the functional group of the cationites becomes smaller with increasing activity. The ion exchangers of aromatic structure are more stable than resins of aliphatic structure. γ- and β-irradiation has the same influence

Card 1/2

The Radio-Chemical Stability of the Ion Exchange Resins Under the Influence of γ- and β-Rays on the Cationites

on the cationites. The irradiation of cationites in air under the influence of γ-rays causes deeper destructive changes in the cationites. There are 1 figure, 2 tables, and 3 Soviet references.

ASSOCIATION: Kafedra tekhnologii radioaktivnykh, redkikh i rasseyannykh elementov Moskovskogo khimiko-tekhnologicheskogo instituta im. D. I. Mendeleyeva (Chair of Technology of the Radioactive, Rare and [illegible] Elements at the Moscow Chemical and Technological Institute imeni D. I. Mendeleyev)

SUBMITTED: March 24, 1958

AUTHORS: Tarasova, Z.N., Kaplunov, M.Ya., Dogadkin, B.A., Karpov, V.L. Breger, A.Kh.

SOV/138-58-5-4/9

TITLE: Vulcanisation by Nuclear Radiation (Vulkanizatsiya pod vozdeystviyem yadernykh izlucheniy)

PERIODICAL: Kauchuk i Rezina, 1958, Nr 5, pp 14-21 (USSR)

ABSTRACT: During recent years it was found that polymeric materials undergo deep structural changes when irradiated with high energy rays (x-rays and nuclear radiation). Investigations on the vulcanisation of rubbers and rubber mixtures by radioactive irradiation were carried out (Refs.1-7). This method of vulcanisation is called "radiation" vulcanisation. The authors investigated the structure and the properties of radiation vulcanisates obtained by irradiating rubbers and their mixtures in an atomic reactor and by gamma radiation from Co^{60}. They also determined the conditions for preparing the homogeneous

Vulcanisation by Nuclear Radiation

solid and multi-layer articles (tyres) by the action of nuclear radiation. The following rubbers were tested: natural, butadiene-styrene SKS-30A and SKS-30AM, isoprene SKI and sodium-butadiene SKB. The rubbers were vulcanised in thin layers in steel or aluminium moulds. The degree of cross-linking of the molecular chains of rubber during irradiation vulcanisation depends on the admixtures in the rubber and on the molecular weight of the rubber and is also affected by the presence of oxygen. The influence of the medium in which radiation takes place on the degree of structure formation of purified natural rubber during radiation vulcanisation is shown graphically in Fig.1; the influence of the medium on the kinetic formation of cross-links during radiation vulcanisation is tabulated (Table 1). On studying the infra-red spectra it was noted that the presence of phenyl-β-naphthylamine strongly inhibited the oxidation processes during irradiation. Spectra of electron paramagnetic resonance showed that samples of SKS-30AM irradiated on air had increased

content of free radicals (Table 3). The effect of anti-oxidants on the properties of radiation vulcanisates is due, to a considerable extent, to the decreased number of double bonds in the presence of anti-oxidants. Fig.2: the relaxation of tension of rubbers subjected to radiation vulcanisation in air; Fig.3: the dependence of the constant of the rate of relaxation of the above vulcanisates on the number of cross-links. Due to the high power of penetration of nuclear rays, uniform vulcanisation is achieved throughout the sample (Table 4). The thickness of the vulcanising grate is defined by the dosage of absorbed energy, by the type and composition of the rubber, by the amount of fillers, plasticisers and anti-oxidants in the mixture and the conditions of irradiation as well as by some other factors. The radiation vulcanisates show thermo-mechanical stability surpassing the stability of vulcanisates containing thiuram. Activated carbon decreases the rate of chemical relaxation of radiation vulcanisates.

Vulcanisation by Nuclear Radiation

During the irradiation of purified rubbers intense oxidation occurs; this leads to complete loss of unsaturation when the dosage of irradiation = 60 mega roentgen. In this case the amount of double bonds is decreased to 30%. Conditions for preparing homogeneous vulcanisation grates were found to be independent from the thickness of the samples (within the limits of 0.1 - 40 mm). The physico-mechanical and technological properties of rubbers prepared by vulcanisation radiation were tested (Table 5). It was found that these vulcanisates were more resistant to thermo-oxidative ageing than sulphur-vulcanisates (4 - 5 times at 130°C), undergo small residual deformation, show low hysteresis and high recovery when subjected to repeated deformation. The vulcanisation of model tyre casings 7.50 x 20, 1/5th natural size, was carried out (Fig.8). Changes in the physico-mechanical characteristics of various tyre cords during irradiation in an atomic reactor are given in Table 7. Members of the Institute

Vulcanisation by Nuclear Radiation

im. L.Ya Karpov: V.B.Osipov, V.A.Gol'din, V.S.Pokrovskiy and V.P.Afonin assisted during these experiments. There are 8 figures, 7 tables and 14 references of which 10 are English and 4 Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific-Research Institute for the Tire Industry)

BREGER, A.Kh.; Prinimali uchastiye: KARPOV, V.L., kand.khim.nauk; BELYNSKIY, V.A.; OSIPOV, V.B., PROKUDIN, S.D.; TYURIKOV, G.S., kand.khim.nauk; GOL'DIN, V.A.; RYABUKHIN, Yu.S.; KOROLEV, G.N.; AFONIN, V.P.; POKROVSKIY, V.S.; KULAKOV, S.I.; LEKAREV, P.V.; FEDOROVA, T.P.; KOROTKOVA, M.A.; KHARLAMOV, M.T.; NIKOLENKO, G.D.; LOPUKHIN, A.F.; YEVDOKUNIN, T.F.; KASATKIN, V.M.; RATOV, A.V.

Nuclear radiation sources for radiational-chemical studies. Probl.fiz.khim. no.1:61-72 '58. (MIRA 15:11)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. Karpova.
(Radiochemistry) (Radioisotopes)

21(9) SOV/89-5-5-4/27

AUTHORS: Ryabukhin, Yu. S., Breger, A. Kh.

TITLE: The Circulation Loop of a Nuclear Reactor as a Radiation Source, Especially for Radiation Chemistry (Tsirkulyatsionnyy kontur yadernogo reaktora kak istochnik izlucheniy, v chastnosti dlya radiatsionnoy khimii)

PERIODICAL: Atomnaya energiya, 1958, Vol 5, Nr 5, pp 533-541 (USSR)

ABSTRACT: A substance to be activated is sent through a loop which passes through the reactor and is connected with a radiation chamber. The γ-radiation emitted by the substance is used in a radiation chamber (e.g. for radiation-chemical work). The problem to be solved is to determine by calculation the optimum duration of time during which the substance to be activated should remain in the reactor, in the radiation chamber, and in the connecting tubes. For this purpose it is necessary that with a given neutron flux, with given activation properties of the substances, and an assumed time of operation of the loop, the average energy of γ-radiation emitted per second in the radiation chamber per liter of the activated substance must be a maximum. The problem is solved

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The Circulation Loop of a Nuclear Reactor as a Radiation Source, Especially for Radiation Chemistry

only for an isotope, which is not a radioactive product produced during activation. The corresponding formulae and families of curves are given.
The calculation of a loop in which liquid indium circulates is particularly instructive. The neutron flux is assumed to be $10^{13} n/cm^2.sec$, the volume to be activated in the reactor - 1 l, duration of the circulation of the loop - 50 days, length of connecting tubes - 20 m, the smallest permissible cross section in the connecting tubes - 0,5 cm^2, with a maximum velocity of flow amounting to 0,1 m/sec. From these data it follows that the average energy of γ-radiation amounts to 2 700 W/l, which corresponds to a preparation with an activity of $2,7.10^5$ gram equivalent Ra in one liter.
In the case of optimum working conditions the energy of γ-radiation can be increased to 4 900 W/l.
Professor V. I. Veselovskiy gave general directives with respect to the investigations to be carried out, and results were discussed with V. L. Karpov.

Card 2/3 The mathematical derivation of the principal formula is

The Circulation Loop of a Nuclear Reactor as a Radiation Source, Especially for Radiation Chemistry

described in an appendix. There are 4 figures, 1 table, and 10 references, 1 of which is Soviet.

SUBMITTED: March 15, 1958

Card 3/3

BREGER, A. Kh.

PHASE I BOOK EXPLOITATION SOV/3818

Postoyannyy mezhinstitutskiy kollokvium po tverdym fazam peremennogo sostava

Kachestvo materialov dlya poluprovodnikovoy tekhniki (Quality of Materials for Semiconductor Technology) Moscow, Mettalurgizdat, 1959. 192 p. (Series: Its: Trudy, 1957-1958, vyp. 8-30) 3,600 copies printed.

Sponsoring Agencies: USSR. Sovet Ministrov. Gosudarstvennyy komitet po khimii; Akademiya nauk SSSR. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.

Ed. (Title Page): B.F. Ormont, Professor; Ed. (Inside Book): Ya.V. Yakovlev; Ed. of Publishing House: L.M. Kl'kind; Tech. Ed.: P.G. Islent'yeva; Editorial Board of Series: I.P. Alimarin, Corresponding Member, Academy of Sciences USSR, Geochemistry Institute, M.V. Grigor'yev, Scientific Research Institute, Committee on Radioelectronics, R.P. Lastovskiy, Professor, Institute of Chemical Reagents, Chemistry Committee, B.F. Ormont, Professor, Academy of Sciences USSR, Institute of Physics and Chemistry imeni L.Ya. Karpov, B.L. Porosheniu, State Rare Metals Scientific Research Institute, N.P. Sazhin, Corresponding Member, Academy of Sciences USSR, State Rare Metals Scientific Research Institute, G.Ya. Tarasov, Scientific Research Institute, Committee on Radioelectronics, Ya.V. Yakovlev, (Resp. Secretary of the Board) Institute of Geochemistry, Academy of Sciences USSR.

PURPOSE: This book is intended for technical personnel engaged in the manufacture and utilization of semiconductors.

COVERAGE: This book treats methods of obtaining quality semiconductor materials and presents current standardized specifications for semiconductors and auxiliary materials. The book is divided into three parts. Part I consists of 16 reports delivered at two conferences in January 1957 and December 1958 at the Fiziko-khimicheskiy institut imeni L.Ya. Karpova (Institute of Physics and Chemistry imeni L.Ya. Karpov) by members of 36 participating institutes and industrial plants. The reports deal with the standardization of characteristics of pure semiconductor materials and describe spectral and spectrochemical analysis, and chemical, vacuum-fusion, polarographic, and radioactivation methods for studying semiconductor materials and determining impurities in them, along with the equipment used.

PART I. REPORTS ON METHODS FOR THE DETERMINATION OF MICROIMPURITIES IN SEMICONDUCTOR MATERIALS PRESENTED AT THE CONFERENCES ON THE QUALITY OF SEMICONDUCTOR MATERIALS

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SOV/64-59-6-3/28

21(8)

AUTHOR: Breger, A. Kh.

TITLE: Some Scientific and Technical Problems of the Development of Radiochemical Apparatus

PERIODICAL: Khimicheskaya promyshlennost', 1959, Nr 6, pp 474 - 481 (USSR)

ABSTRACT: Radiochemistry, which owing to the development of the nuclear industry has become a special branch of chemistry, may be regarded as one of the most important fields of application of nuclear power in the national economy (Refs 4-6). Units of the series "K" (Refs 8-12) designed and installed at the Fiziko-khimicheskiy institut im. L. Ya. Karpova (Institute of Physical Chemistry imeni L. Ya. Karpov) (i.e. units "K-300", "K-600", "K-1400", "K-20000", "K-20000-b", and "K-60000" with Co^{60} emitting γ-rays of an activity of 300 to 60000 gramequivalent of Ra) proved favorable for radiochemical investigations. Since relevant publications have not so far carried suggestions for the design of apparatus for radiochemical investigations, this question is dealt with in the present article as well as in papers published earlier by the above institute (Refs 18,19). The principal variants of sources of nuclear radiation are listed (Table 1) and it is stated that heterogeneous systems are better suited for radiochemical investigations than homo-

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Some Scientific and Technical Problems of the Development of Radiochemical Apparatus

geneous ones, and that systems with γ-rays from Co^{60} and Cs^{137} have some advantages to offer. After a discussion of the various applications of the different sources of γ-radiation for radiochemical processes on an industrial scale the author arrives at the conclusion, on the basis of data concerning the activities of γ-rays obtained in nuclear reactors (Table 2), that prospects at present are best for the use of heat-radiating parts of the nuclear reactors. The principal requirements for the development of radiochemical apparatus are discussed in great detail (classed in five groups). A comparison of such apparatus with apparatus for radiation-biological investigations makes it apparent that most apparatus designed for biological investigations are not suited for radiochemical investigations. There are 3 tables and 41 references, 35 of which are Soviet.

21(9)

SOV/89-7-2-5/24

AUTHORS: Ryabukhin, Yu. S., Breger, A. Kh.

TITLE: The Circulation System of a Nuclear Reactor as a Source of Radiation (Tsirkulyatsionnyy kontur yadernogo reaktora kak istochnik izlucheniy)

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 2, pp 129 - 137 (USSR)

ABSTRACT: The task described in reference 1, i. e. consideration of a circulation loop containing one single isotope, as a radiation source and computing the strength of this source, was extended for such cases when several isotopes form in the substance to be activated and these isotopes have a series of radioactive decay products. The absolute maximum output of such a circulation system and the neutron consumption per output unit was theoretically calculated for the following elements: Na, Sc, Mn, Ga, Br, In, Sb, La, Ir which can be considered as materials to be activated in the circulation. It was found that In and its alloys can be best utilized. A circulation was separately examined in which the substance to be activated contained fissile isotopes (uranium circulation). It was proved that the specific capacity of this kind of circulation under the same conditions

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is less than that of a circulation in which metal Indium or its alloys are being irradiated. As a special case they examined in an irradiation apparatus the uranium circulation of fuel not completely burned out in a reactor. The authors show that in this case the capacity can be increased 2-4 times in comparison with a device in which fully burned out fuel elements are used only once. The theoretically developed formulas for the specific capacity of circulations are separately derived in an annex. There are 3 figures, 2 tables, and 16 references, 6 of which are Soviet.

SUBMITTED: July 25, 1958

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~~25(5),5(1)~~

AUTHORS: Vaynshteyn, B.I., Breger, A.Kh., Syrkus, N.P.

S/064/59/000/07/002/035
B005/B123

TITLE: Computation of a Radiation-chemical Apparatus With a Strong Gamma Radiation Source for the Oxidation of Benzene to Phenol

PERIODICAL: Khimicheskaya promyshlennost', 1959, Nr 7, pp 560-565 (USSR)

ABSTRACT: A radiation-chemical process which could reach practical importance, is the direct oxidation of benzene to phenol with oxygen, in the presence of products of water radiolysis (Refs 1-3). Under certain technological conditions stated in the paper, this process becomes a chain reaction. The yield then amounts to 30-60 molecules per 100 ev absorbed energy. The technological scheme for carrying out this oxidation is described in publications (Ref 3). The authors of the present paper calculated the capacity of radiation-chemical apparatus of various constructions that work with intensive γ-rays. The computations were made for γ-sources from Co^{60} preparations with a total activity of $\sim 10^6$ g-equivalent radium or from the fuel elements of a reactor, type VVR-Ts with a thermal power of 10 Mw. The capacity of such an apparatus is computed from

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Computation of a Radiation-chemical Apparatus With a Strong Gamma Radiation Source for the Oxidation of Benzene to Phenol

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the formula: $Q = K \frac{wGM}{N} \eta$ (Q = capacity of apparatus in kg per hour; K = coefficient considering the dimensions of the apparatus; w = dose rate of the source of γ-radiation in watts; G = radiation-chemical yield (number of molecules per 100 ev absorbed energy); M = molecular weight of the product in g/mol; N = Avogadro number; η efficiency of the radiation-chemical apparatus (proportion of dose rate of γ-radiation that is absorbed by the chemical system, to the dose rate that is supplied by the source). For phenol it results for G = 30: $Q = 1.05 \cdot 10^{-3} w \eta$. The computations made are described in detail. Detailed data of the construction of radiation-chemical apparatus and the optimum dimensions of the radiation source are given. Figure 1 shows schematic cross sections through some possible variants of a radiation-chemical apparatus for the oxidation of benzene to phenol. Table 1 gives the working characteristics for various variants of such radiation-chemical apparatus, where Co^{60}-preparations or the fuel elements of the VVR-Ts reactor are used as radiation source. Table 2 shows the

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Computation of a Radiation-chemical Apparatus With a Strong Gamma Radiation Source for the Oxidation of Benzene to Phenol

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accessible doses of γ-radiation of a source consisting of all fuel elements of the VVR-Ts reactor. Table 3 shows the relations between the capacity Q and $T = \bar{t}$ (T = working time of the fuel elements in the reactor, $\bar{t}$ = time of cooling). According to calculations of the authors the yearly production of phenol in one of the apparatus described, with a radiation-chemical yield of G = 60 molecules per 100 ev in a reactor with the thermal power of 1000 Mw, amounts to about 10,000 t. In the present paper a previous article of the authors is referred to that was submitted to the konferentsiya po mirnomu ispol'zovaniyu atomnoy energii (Conference on the Peaceful Uses of Atomic Energy), held in Tashkent from September 28 to October 3, 1959. There are 8 figures, 3 tables, and 8 references, 7 of which are Soviet.

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AUTHORS: Syrkus, N. P., Breger, A. Kh., Vaynshteyn, B. I.

S/064/59/000/08/001/021
B115/B017

TITLE: The Fundamental Technological Characteristics of Apparatus for Carrying out Radiochemical Processes (Mainly for the Polymerization of Ethylene), on an Industrial Scale

PERIODICAL: Khimicheskaya promyshlennost', 1959, Nr 8, pp 647-652 (USSR)

ABSTRACT: In the present paper the first attempt of a general consideration of the most important technological characteristics of a device for carrying out radiochemical processes is described by the example of a spherical apparatus. Besides, the technological characteristics of an apparatus used for radiochemical polymerization of ethylene were calculated. The efficiency of a spherical apparatus with a radius r and a monochromatic gamma radiation point source in the center of the sphere with an energy of q curies was calculated, and a formula was deduced. The method used to determine the energy of the absorbed gamma rays was employed for calculation which had been suggested at the Conference for the Peaceful Uses of Atomic Energy in Tashkent from September 28 to October 3, 1959. A diagram of the dependence of the function $[(1-\varepsilon)\mu]^{\alpha}$, $\varkappa(\gamma r, \varepsilon)$ on z at different values of the parameter α (1.5, 2.0 and

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2.5) is given (Fig 1), where ε is a constant which depends on the conditions of the process ($0 \leq \varepsilon < 1$), μ the factor of the electron transformation, $\eta(\mu r, \varepsilon) = \int_0^r \exp[-(1-\varepsilon)\mu \cdot \varrho]\varrho^{2\varepsilon} \cdot d\varrho$ with ϱ the distance of any point in the apparatus from the center, $z = (1-\varepsilon)\mu r$ and $\alpha = 2\varepsilon + 1$. In the following also the efficiency of an infinitely large apparatus ($Q \infty$) with the same radiation source is computed. Also formulas for the computation of the specific efficiency and for the computation of the radius of the spherical layer is deduced. The energetic and the material useful coefficient for the apparatus given were computed, and it was found that in general the energetic useful coefficient is no unambiguous criterion for the efficiency of the apparatus. The technological characteristics of a cylindrical apparatus for radiochemical polymerization of ethylene (with Co^{60} as central radiation source) at 200 atm and 25° were then calculated. Diagrams of the distribution of the activity of the radiation dose in the apparatus (Fig 2), of the dependence of efficiency of the polymerization apparatus with

The Fundamental Technological Characteristics of Apparatus for Carrying out Radiochemical Processes (Mainly for the Polymerization of Ethylene) on an Industrial Scale

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gamma-ray sources of different relative activity (with respect to 1-11,500 curie Co^{60}) on the radius of the apparatus (Fig 3), of the specific and weight efficiency of the apparatus (Fig 4), and of the distribution of the useful factor in the apparatus (Fig 5) are mentioned. The curves in figure 5 show that the apparatus for radiochemical polymerization of ethylene under given polymerization conditions can be computed from the mean values of dose activity $\eta_{e.app}$ and that the method can be employed also for apparatus used for other radiochemical processes. The dependence of the efficiency of the apparatus on the full activity of the gamma radiation source W_o under exactly constant conditions is mathematically proven. There are 5 figures and 9 references, 6 of which are Soviet.

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5(4),21(8)

AUTHORS: Pronman, I. M., Shalashov, V. A., Breger, A. Kh., Zubov, Yu. A.

SOV/20-127-6-32/51

TITLE: Decomposition of the Carbide Phase of White Cast Iron-Cementite Under the Action of Neutron Radiation

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1259-1262 (USSR)

ABSTRACT: The small number of papers written about phase conversions of metals and alloys under the action of neutron radiation is pointed out in the beginning (Refs 1-8). In order to study the above-mentioned process white cupola furnace-cast iron was used, from which cementite was extracted in form of a carbide sediment by electrolysis. The analysis of the initial material made under the management of N. M. Popova is given in table 1. Aluminum containers were placed for irradiation in the active zone of a nuclear reactor (concentrated uranium and ordinary water) with a total neutron flux of 10^{12} neutrons per cm^2.sec. The thermal neutrons were absorbed by an 1 mm thick Cd-filter. The amount of the flux of the 1 Mev fast neutrons was $1\text{-}5.10^{10}$ neutrons per cm^2.sec, and therefore the

total dosage was $0.2\text{-}1.10^{16}$ neutrons per cm^2 for 50 hours of irradiation. The irradiated and the non-irradiated cementite samples were examined by X-ray analysis (Ionication apparatus type URS-50-I, Fe-K-radiation). The irradiated sample showed all lines of the cementite and the most intensive line of graphite (002) as well as lines of Fe_3O_4 (311) with low intensity. After annealing there were no changes observed for the non-irradiated sample while remarkable phase conversions were indicated by the X-ray analysis of the irradiated sample (Fig 2). Table 2 and figure 1 show the phase conversion of Fe_3C dependent on the annealing temperature. The irradiated cementite already deposits almost 2/3 of its iron at only 650°. This decomposition of Fe_3C is caused by centers of crystallization formed by irradiation. α-iron crystallizes at annealing temperatures below the austenite range, and γ-iron at temperatures of the austenite range. Carbon crystallizes in graphite only at temperatures above 1000°. The irradiation dosage applied was insufficient to form adequately active

centers of graphite crystallization. The authors thank V. A. Kargin, Academician, and A. A. Zhukhovitskiy, Professor, for his judgment of the paper under review. There are 2 figures, 2 tables, and 14 references, 8 of which are Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut po normalizatsii v mashinostroyenii (All-Union Scientific Research Institute of Standardization of Mechanical Engineering)
Fiziko-khimicheskiy nauchno-issledovatel'skiy institut im. L. Ya. Karpova (Scientific Research Institute of Physical Chemistry imeni L. Ya. Karpov)

PRESENTED: April 10, 1959, by V. A. Kargin, Academician

SUBMITTED: April 9, 1959

BREGER, A.Kh.; DEMBROVSKIY, M.A.; DMITRIYEV, L.A.; SUNITSA, L.L.; RYABUKHIN, Yu.S.

Dose rate field of a cylindrical irradiator containing Co^{60} a powerful source of γ-radiation. Probl.fiz.khim. no.2: 132-145 '59. (MIRA 13:7)
(Radiation--Dosage) (Cobalt--Isotopes)

BREGER, A.Kh.; KAPLUNOV, M.Ya.; VAYNSHTEYN, B.I.; VIZEL', Ya.M.

Comparative evaluation of the effectiveness of various sources of nuclear radiation employed the process of radiation vulcanization of tires. Kauch.i rez. 19 no.14:17-22 Ap '60. (MIRA 13:12)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni Karpova, Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i Moskovskiy institut khimicheskogo mashinostroyeniya.
(Tires, Rubber)
(Radiochemistry--Industrial applications)

BREGER, A.Kh.; ORMONT, B.F.; VITING, B.I.; GRIZHKO, V.M.; KOZLOV, V.A.; KUTSEV, V.S.; CHAPYZHNIKOV, B.A.; CHEPEL', L.V.

Radioactivation method of determining oxygen in semiconducting meterials and metals on the basis of the photonuclear reaction O^{16} (γ,n) O^{15}. Trudy kom.anal.khim. 10:137-141 '60. (MIRA 13:8)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova, Moskva.
(Oxygen--Analysis)
(Oxygen--Isotopes)
(Semiconductors--Oxygen content)

S/020/60/133/04/19/031
B019/B060

AUTHORS: Pronman, I. M., Shalashov, V. A., Breger, A. Kh.

TITLE: The Influence of an Electron Irradiation Upon the Decomposition of Cementite and the Graphitization of White Cast Iron

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 825-828

TEXT: The authors report here on attempts made to study the influence of electron irradiation on the graphitization of white cast iron and the decomposition of cementite, which represents a metastable phase of white cast iron. The structure of industrial cast iron samples consisted of cementite, ledeburite, and perlite. The temperature of the samples was measured with Pt—PtRh thermocouples, and the energy of the electrons was about 1.7 Mev. Fig.3 shows the variation in hardness of irradiated and nonirradiated samples, annealed at 700°C, from which the effect of electron irradiation upon graphitization can be seen. Experiments made with irradiation of pure cementite prepared with the help of N. M. Popova, in vacuo at a temperature of 600 - 620°C, revealed that cementite is

decomposed to form graphite. Fig. 4 shows an X-ray picture of irradiated cementite. From the fact that cementite irradiated by electrons is chiefly decomposed by their ionizing action, the authors draw the conclusion that iron and carbon atoms in the cementite lattice possess an ion bond. The authors believe that the same effects are bound to arise on a sufficiently strong γ-irradiation. The authors thank Professor Zhukhovitskiy for his discussion of the results. Ye. Ya. Rozinskiy is mentioned. There are 4 figures, 1 table, and 16 references: 11 Soviet, 1 British, 3 US, and 1 German.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences, USSR). Fiziko-tekhnicheskiy institut im. L. Ya. Karpova (Physicotechnical Institute imeni L. Ya. Karpov)

PRESENTED: January 19, 1960, by G. V. Kurdyumov, Academician

SUBMITTED: January 18, 1960

BREGER, A.Kh.; OSIPOV, V.B.; GOL'DIN, V.A.

[Universal plant with a Co^{60} gamma-ray source of 60,000 gram-equivalent Ra for modeling radiochemical apparatus and conducting studies of («K= 60,000»)] Universal'naia ustanovka s istochnikom γ = izlucheniia Co^{60} aktivnost'iu 60 000 z.eKa. Ra dlia modelirovaniia radiatsionno-khimicheskikh apparatov i provedeniia issledovanii («K - 60 000»). Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 14 p. (MIRA 17:4)

PHASE I BOOK EXPLOITATION SOV/4898

Breger, A.Kh.

Istochniki yadernykh izlucheniy i ikh primeneniye v radiatsionno-khimicheskikh protsessakh (Sources of Nuclear Radiations and Their Use in Radiochemical Processes) Moscow [VINITI] 1960. 128 p. 1,000 copies printed.

Sponsoring Agencies: Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov SSSR, Akademiya nauk SSSR, and Vsesoyuznyy institut nauchnoy i tekhnicheskoy informatsii.

Ed. (Title page): V.L. Karpov; Ed.: N.K. Tarakhovskaya; Tech. Ed.: E. Yazlovskaya.

PURPOSE: This book is intended for researchers in radiochemistry.

COVERAGE: This is a critical review of Soviet and other literature on radiation sources published up to September 1958, including studies made under the author's direction at the Fiziko-khimicheskiy institut imeni L.Ya. Karpova (Physics and Chemistry Institute imeni L.Ya. Karpov) in the last 4-5 years. Basic types of radiation sources used in radiochemistry and their fields of application are

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discussed, and isotopic radiation sources and apparatus for radiochemical research and industrial purposes are described in detail. Research installations with Co^{60} gamma-radiation sources and with an activity of up to 20,000 gram-equivalents of radium, designed and operated by the Physics and Chemistry Institute imeni L.Ya. Karpov, are described briefly. The radiation circuit theory of a nuclear reactor is discussed and basic data on theoretical calculation of dose fields, created by radiation sources of various configurations, are presented. Experimental methods for measuring dose fields and the energy absorbed by irradiated objects, as well as problems relating to shielding and safety, are dealt with. The author lists the following collaborators, and the chapters on which each worked: B.I. Vaynshteyn and N.P. Syrkus, Chs. II, III, and VI; V.A. Kozlov, Ch. IV; and Yu. S. Ryabukhin, Chs. V and VI. He also thanks S.I. Berestetskaya and N.A. Krasnoschekova. There are 230 references: 100 Soviet, 128 English, and 2 French.

TABLE OF CONTENTS:

BREGER, A.Kh.; Prinimali uchastiye: VAYNSHTEYN, B.I.; SYRKUS, N.P.; RYABUKHIN, Yu.S.; KOZLOV, V.A.; KARPOV, V.L., red.; TARAKHOVSKAYA, N.K., red.; YAZLOVSKAYA, E., tekhn.red.

[Nuclear radiation sources and their application to radiochemical processes] Istochniki iadernykh izluchenii i ikh primenenie v radiatsionno-khimicheskikh protsessakh. Pod red. V.L. Karpova. Moskva, Vses.in-t nauchn.i tekhn.informatsii, 1960. 128 p. (MIRA 13:10)
(Radiation) (Radiochemistry)

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S/081/61/000/022/004/076
B102/B108

AUTHORS: Breger, A. Kh., Vaynshteyn, B. I., Guzey, L. S., Ryabukhin, Yu. S., Syrkus, N. P.

TITLE: Gamma-radiation absorption in macrosystems

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1961, 37, abstract 22B254 (Tr. Tashkentsk. konferentsii po mirn. ispol'zovaniyu atomn. energii. Tashkent, AN UzSSR, v. 2, 1960, 123-132)

TEXT: The gamma radiation energy absorbed by an object is determined as the difference between the γ-radiation energy flux from the source and γ-energy flux passing through the object's surface. An accumulation factor for the energy flux and a useful coefficient of the source with respect to γ-radiation are defined. The energy from Co^{60} (~2 g-equ. Ra) absorbed by the object was measured by means of a chemical dosimeter - a ferrosulfate solution filled into volumes of various shapes. The γ-radiation energy flux was also measured by the ferrosulfate method. It was shown that if the source was placed in the center of a cylinder the absorbed energy is twice as high as that when the source is located at the

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Gamma-radiation absorption ...

bottom plane of a cylinder which is half as high. The accumulation factors were calculated by comparing the experimental and theoretical results without taking multiple scattering into account. γ-radiation absorption in volumes of complex shape was studied at various positions of the sources. [Abstracter's note: Complete translation.]

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A051/A029

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AUTHORS: Breger, A.Kh., Kaplunov, M.Ya., Vaynshteyn, B.I., Vizel', Ya.M.

TITLE: A Comparative Evaluation of the Effectiveness of Various Sources of Nuclear Emissions for the Vulcanization Process of Tires by Irradiation

PERIODICAL: Kauchuk i Rezina, 1960, No. 4, pp. 17 - 22

TEXT: The use of nuclear energy has increased in chemical technology (Refs. 1 - 3, 5 - 7, 14). Rubber acquires new properties in vulcanization by irradiation. These vulcanizates have an elevated resistance to thermal and thermo-acidic aging, an elevated thermomechanical resistance and high resistance to repeated deformations. The importance of selecting the proper source of radiation in the radiation vulcanization of tires is stressed. The geometry of the emitter must be determined and the effectiveness of the different radiation sources must be evaluated. The purpose of this article was to solve these problems in order to apply the process of vulcanization by ir-

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A Comparative Evaluation of the Effectiveness of Various Sources of Nuclear Emissions for the Vulcanization Process of Tires by Irradiation

radiation to the tubeless 6.70 - 15 tire of the "Volga" automobile. The following problems were investigated: 1) an evaluation of the field uniformity of the doses on the cross-section of the tread, 2) a computation of the radiation time at a given energy output of the emitter or estimating the energy output of the emitter according to the given vulcanization period (the energy of the emitter is taken to be the γ-emission energy), 3) determining the power efficiency factor in each individual case of the system's γ-emission efficiency output. The average integral dose of radiation needed for the vulcanization process was taken to be $25 \cdot 10^6$r (Refs. 6 - 8). Two types of emission sources were investigated, namely, a circulating contour (nuclear reactor-radiation installation) where the γ-emitter is an indium-gallium alloy with 16.5 atomic % of indium), and heat-emitting wastes of a BBP-U (VVR-Ts)-type nuclear reactor with a heat capacity of 10 Mw. Each source investigated is described in detail. As a result of the investigations several conclusions are drawn: 1) The comparative evaluation of the two sources for radiation vulcanization of tires showed that a circulating contour power efficiency factor ($\eta \sim 2.0\%$) had greater possibilities as a γ-emitter. There were

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A Comparative Evaluation of the Effectiveness of Various Sources of Nuclear Emissions for the Vulcanization Process of Tires by Irradiation

several technical difficulties, however, as compared to the waste product source. 2) When using waste products of a VVR - Ts type reactor, it was more expedient to design the emitter in the form of two parallel planes ($\eta \sim$ ~0,3%). If the emitter is built in the form of 2 co-axial cylinders, $\eta \sim 0.2\%$. 3) The power efficiency factor of the γ-emission for the investigated cases can be increased if a special shape of the press-die is developed and a structural material chosen which ensures minimum absorption of the γ-emission. 4) The data obtained can be used as the basis for computing the apparatus of radiation vulcanization for test batches of tires. There are 5 diagrams and 15 references: 12 Soviet and 3 English.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. Karpova, Nauchno-issledovatel'skiy institut shinnoy promyshlennosti, Moskovskiy institut khimicheskogo mashinostroyeniya (Scientific Physical-Chemical Research Institute imeni Karpov Scientific Research Institute of the Tire Industry, Moscow Institute of Chemical Engineering)

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B110/B138

21 5151

AUTHORS: Breger, A. Kh., Gurvits, S. S., Pozdnyakova, L. A., Chistov, Ye. D.

TITLE: Some protection problems in the use of radiation chemical apparatus

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 17, 1961, 306, abstract 17И362 (Sb. nauchn. rabot in-tov okhrany truda VTsSPS, no. 4, 1960, 12-23)

TEXT: When studying the range of dose rates in the labyrinth protection of two radiation chemical research units, with strong Co^{60} γ radiation sources of 21,000 and 16,000 g-equiv Ra, the authors found that, from the viewpoint of radiation safety, labyrinth shielding of both units reduces the dose rate down to tolerance level. The dose rate of γ radiation in labyrinths of the units is almost wholly due to scattered radiation. For a more rational design of the labyrinth it is recommended that the depth of the first concrete projection should be reduced. A rough determination of the energy spectrum of the γ radiation in the

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29422
S/081/61/000/017/064/166
B110/B138

Some protection problems in the use...

labyrinth is made from the absorption in lead filters. The scattered radiation is found to consist mainly (80 %) of a soft component with an energy 0.1-0.2 Mev. In the second and the following windings of the labyrinth there is only a slight change in the hardness of scattered radiation. An equation is suggested by means of which the range of dose rates in labyrinths can be calculated with a sufficient accuracy for practical purposes. [Abstracter's note: Complete translation.]

Card 2/2

82735

S/089/60/009/002/006/015
B006/B056

21.1940

AUTHORS: Ryabukhin, Yu. S., Breger, A. Kh.

TITLE: A "Radiating" Nuclear Reactor 19

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 2, pp. 132-133

TEXT: The authors used the term "radiating" reactor for such reactors whose coolant- or fuel circuit may be used as gamma-radiation source. A disadvantage of reactors with circulating fuel is the occurrence of retarded neutrons and comparatively low specific radiation power; reactors with sodium coolants also have a low specific radiation power, and a further disadvantage is the high chemical activity of sodium. A uranium reactor with a graphite (or beryllium) moderator, enriched to 10 - 25%, would not have these disadvantages. A liquid indium-gallium alloy might be used as coolant, which would, at the same time, be a carrier of the gamma activity. The main radiation power is supplied by indium, and gallium serves the purpose of reducing the melting point of the alloy (at 16.5 at% In it is about 16°C). The specific radiation power of this alloy in a flux of 10^{13} n/cm^2·sec is 1,200 w/l. The authors theoretically investigated such a reactor already in an earlier paper (Ref. 1), and carried out estimations of the neutron-

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and thermal equilibrium and the radiation power of the circuit. Thus, 40 l of a coolant of the aforementioned composition with a temperature of 50 - 300°C suffice for a heterogeneous uranium-graphite reactor with a 20% enrichment and a heat output of 20 Mw. The optimum radiation power of an ideal group is ~40 kw (equivalent to 4.10^6 g Ra). The radiation power of such a reactor might, for instance, be used for the polymerization of 4,400 tons of polyethylene per annum; the costs of such a production would amount to 200 million rubles. The maximum gamma-radiation energy is 1.5% of the fission energy (in the case of an ideal loop). The authors finally thank Academician A. P. Aleksandrov, V. L. Karpov, S. M. Feynberg, Yu. F. Chernilin, and Ye. P. Kunegin for discussions. There are 9 references: 3 Soviet, 5 US, and 1 Canadian.

SUBMITTED: April 22, 1959

Card 2/2

80084
S/020/60/131/06/22/071
B014/B007

5.4500(B)
24.6100

AUTHORS: Breger, A. Kh., Vaynshteyn, B. I., Guzey, L. S., Ryabukhin, Yu. S., Syrkus, N. P.

TITLE: The Absorption of Gamma-emission ^{19} in Macrosystems From a Point Source

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 131, No. 6, pp. 1308 - 1311

TEXT: The authors define the absorbed power of γ-emission with $Q_a = \Phi_0 - (\Phi_{surf} + \Phi_{scatt})$, where Φ_0 is the total power of the energy flux of the γ-emission of the source, and Φ_{surf} - the power of the flux leaving the absorbing body, and Φ_{scatt} - the power of the scattered flux. The factor of the accumulation B_Φ of the integral energy flux of the γ-emission is defined by $B_\Phi = 1 + \Phi_{scatt}/\Phi_{surf}$ and by the notations $Q_a/\Phi_0 = \eta$; $\Phi_{surf}/\Phi_0 = \varphi_{surf}$ is obtained for the efficiency $\eta = 1 - B_\Phi \varphi_{surf}$. For a spherical absorbing body in the center of which the source is located, η may easily be written down. For a cylindrical body (Fig. 1) the

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The Absorption of Gamma-emission in Macrosystems From a Point Source

authors derive formula (4) for φ_{surf}. Determination of B_Φ was carried out in a test series, in which dosimetric solutions were located in cylindrical containers with different radii. In a copper tube, which was fitted to the cylinder axis, the γ-source could be moved from without. Measured values for five different cylinder diameters within the range of from 3 to 12 cm are graphically represented in Fig. 3. It is found that the relation $B_\Phi = F(h/r, \mu r)$ holds, where h denotes the height of the cylinder calculated from the source, r - the radius of the cylinder, and μ the coefficient of the linear weakening of the γ-emission in the substance (Fig. 3). In this way it was possible to determine not only the amount of the absorbed energy, but also the above introduced factor of the accumulation of the integral energy flux. This factor may be used also in investigations of the absorbed energy which are carried out with other configurations of the source or of the absorbing object. The authors thank N. A. Krasnoshchekova and Ye. D. Kalmykova for their help in performing this work. There are 4 figures and 12 references, 9 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Research Institute of Physics and

Card 2/3

80084
The Absorption of Gamma-emission in Macrosystems From a Point Source S/020/60/131/06/22/071 B014/B007

Chemistry imeni L. Ya. Karpov)

PRESENTED: December 17, 1959, by V. A. Kargin, Academician

SUBMITTED: December 16, 1959

Card 3/3

BREGER, A. Kh. Doc Tech Sci -- "Principles of development and use of plants with powerful sources of nuclear radiation for the carrying out of chemical-radiation processes." Mos, 1961 (Inst of Electochemistry, Acad Sci USSR).

(KL, 4-61, 193)

POCHAPINSKIY, V.I.; YERMOL'EVA, Z.V.; BREGER, A.Kh.

Radiation sterilization of antibiotic preparation. Report No.4. Med. prom. 15 no.9:28-33 S '61. (MIRA 14:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut antibiotikov i Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni L.Ya. Karpova.

(ANTIBIOTICS) (RADIATION STERILIZATION)

S/081/62/000/008/010/057
B166/B101

AUTHOR: Breger, A. Kh.

TITLE: Gamma radiation sources for radiochemical apparatus.

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 8, 1962, 57, abstract 8B409 (Sb. "Radioakt. izotopy i yadern. izlucheniya v nar. kh-ve SSSR. V. 1". M., Gostoptekhizdat, 1961, 169-175)

TEXT: Nuclear radiation sources for effecting radiochemical processes on a semi-industrial scale are examined. Preference is given to the use of heat-producing elements and to the radiation loops of nuclear reactors. An evaluation of the efficiency of various conditions of utilizing heat-producing elements is given. [Abstracter's note: Complete translation.]

Card 1/1

34696
S/081/62/000/003/085/090
B 162/B101

11.2211
15.9300

AUTHORS: Dogadkin, B. A., Tarasova, Z. N., Kaplunov, M. Ya., Breger, A. Kh., Kepersha, L. M., Vaynshteyn, B. I., Vizel', Ya. M., Karpov, V. L.

TITLE: Intensification of the process of radiation vulcanization and technical principles of an experimental installation for radiation vulcanisation of tyres

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1962, 595 - 596, abstract 3P275 (Sb. "Radioakt. izotopy i yadern. izlucheniya v nar. kh-ve SSSR, v. I", M., Gostoptekhizdat, 1961, 184 - 196)

TEXT: An investigation was made into the effect of medium (air and vacuum), temperature (from -196 to 100°C), sensitizers and inhibitors on radiation vulcanization under the action of Co^{60} γ - radiation of butadiene, butadiene-styrene and natural rubber. The degree of cross-linking in air is higher than in vacuum. In the presence of 2 % phenyl - β - naphthyl-amine the radiation-chemical yield of cross-links per 100 ev of absorbed

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Intensification of the process ...

energy drops by half for butadiene rubber in vacuum. The decrease in non-saturation is only partially explained by cross-linking and oxidation, and in the main this phenomenon is probably connected with the formation of intra-molecular rings. The cross-linking at different temperatures depends to a large extent on the structure of the rubber. Aliphatic poly-halides reduce the required radiation dose by half (to 25 Mr) and ensure the production of rubbers with a static strength equal to the strength of the best sulphur vulcanized rubbers. Vulcanization of rubbers containing carboxyl by the combined action of metal oxides and nuclear radiation (dose 10 Mr) gives vulcanized rubbers with high thermal stability and high strength properties. An investigation was made into the kinetics of the addition of styrene and 2,5 -dichlorostyrene to natural rubber and butadiene-styrene rubber and to mixtures of these with channel black with irradiation in Ar. An acceleration of vulcanization was observed in the presence of these monomers and vulcanized rubbers were obtained which possessed high thermomechanical stability and strength. The technical principles of a technological process for an experimental installation for radiation vulcanization of tyres are examined. Different types of γ-radiation sources were compared: radiation In-Ga loop of a nuclear reactor,

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Intensification of the process ...

spent-fuel assemblies, Co^{60} and different types of irradiators. A scheme is proposed for a technological process for an experimental installation with spent-fuel assemblies. [Abstracter's note: Complete translation]

Card 3/3

BREGER, A. Kh.

3962L
S/081/62/000/009/019/075
B150/B101

5.4600

AUTHORS: Topchiyev, A. V., Polak, L. S., Chernyak, N. Ya., Glushnev, V. Ye., Glazunov, P. Ya., Vereshchinskiy, I. V., Syrkus, N. P., Breger, A. Kh., Vaynshteyn, B. I.

TITLE: Radiation-heat cracking of hydrocarbons

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1962, 74 - 75, abstract 9B513 (Sb. "Radioakt. izotopy i kibern. izlucheniya v nar. kh-ve SSSR. v. I". M., Gostoptekhizdat, 1961, 206-210)

TEXT: The low overall yield of radiolysis products from hydrocarbons at room temperature points to the absence of a chain reaction at that temperature. To examine the possibilities of a chain reaction in radiation cracking, n-heptane was irradiated by Co^{60} γ-rays at high temperatures. The samples were irradiated in 15 ml bulbs made of molybdenum glass with a wall thickness of ~1 mm. The amount of liquid heptane was 0.25 ml and the pressure in the ampoules on vaporization 2.5 T/273 atm. To prevent local preheating of the walls, the bulb was rotated twice a second. The

Radiation-heat cracking of hydrocarbons

S/081/62/000/009/019/075
B150/B101

radiation dose output calculated on 1 ml of liquid n-heptane was $2 \cdot 10^{13}$ Mev/sec. It is shown that radiation-heat cracking of n-heptane occurs at considerably lower temperatures than purely thermal cracking which needs a temperature of $\sim 500^{\circ}C$. The yield of liquid unsaturated hydrocarbons from radiation-heat cracking increases from 1.8 at room temperature to 340 at 450°C. The total radiation-chemical yield of low molecular hydrocarbons is 2000 at 400°C, being therefore $\sim 10^3$ times as great compared with the radiation-chemical yield of the same products at 20°C. By combining the radiation effect with temperature it is possible to obtain products which offer industrial interest at levels of yield which would be acceptable in practice. Possible sources of radiation for radiation-heat cracking are considered. [Abstracter's note: Complete translation.]

Card 2/2

S/081/62/000/004/034/087
B156/B138

AUTHORS: Breger, A. Kh., Osipov, V. B., Gol'din, V. A.

TITLE: The universal K-60 000 (K-60 000) apparatus, with a Co^{60} gamma-radiation source, its activity 60 000 g-equiv. of radium for simulating chemical radiation apparatus and carrying out research

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 4, 1962, 305, abstract 4I137 (Sb. "Radioakt. izotopy i yadern. izlucheniya v nar. kh-ve SSSR, vol. I", M., Gostoptekhizdat, 1961, 227 - 232)

TEXT: A universal apparatus is described for simulating chemical radiation apparatuses, and for conducting research with a Co^{60} γ-radiation source of activity ~60 000 g.-equiv. of radium. This design of apparatus enables a powerful source of radiation to be assembled safely using a special container for transportation and charging. This apparatus can be used for simulating chemical radiation apparatus with powerful isotopic sources of γ-radiation, and of various shapes and dimensions.
[Abstracter's note: Complete translation.]

Card 1/1

31557
S/081/61/000/022/037/076
B110/B101

27.2400 2220

AUTHORS: Breger, A. Kh., Gurvits, S. S., Pozdnyakova, L. A., Chistov, Ye. D.

TITLE: Experimental study of protection when using radiation-chemical units with powerful γ-radiation sources

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1961, 270, abstract 22I308 (Sb. "Radioakt. izotopy i yadern. izlucheniya v nar. kh-ve SSSR. v. I". M. Gostoptekhizdat, 1961, 241 - 243)

TEXT: On the basis of experimental results obtained in tests of the K-20000 (K-20,000) and N-16000 (N-16,000) units the field distribution of dose rates in the mazes of these units was given. The energy of scattered γ-radiation was estimated by the method of radiation absorption by lead filters. 80% of scattered radiation was found to consist of the soft component with an energy of 0.1 - 0.2 Mev. In the radiation maze, the energy of scattered radiation changes but slightly after the first turn. [Abstracter's note: complete translation.]

Card 1/1

S/020/61/136/003/026/027
B016/B052

AUTHORS: Breger, A. Kh., Ryabukhin, Yu. S., and Makhlis, F. A.

TITLE: The Effective Utilization of Fuel Elements of Nuclear Reactors as Sources of γ-Radiation in Radiochemical Equipment

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 3, pp. 671-674

TEXT: The authors made a theoretical study to determine the possibilities of utilizing industrial atomic waste, especially nuclear reactor fuel elements as sources of γ-radiation in equipment used for radiochemical processes. The data of Refs. 5-9 on the radiation intensity of fission fragment mixtures (γ or β+γ) offer no possibilities of calculating the efficiency of various applicabilities of fuel elements. For this, it would be necessary to know the average specific γ-radiation power K released in the equipment during the whole operation period of the reactor body:

$$\bar{P} = \sum_{i=1}^{n} E_i^{\gamma}/K = \bar{P}\ (t_p, t_{\gamma}, t_B, n)\ (I),$$ where $\sum_{i=1}^{n} E_i^{\gamma}$ denotes the

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The Effective Utilization of Fuel Elements of Nuclear Reactors as Sources of γ-Radiation in Radiochemical Equipment

S/020/61/136/003/026/027
B016/B052

γ-radiation power of the fragments released in the equipment during the operation of the fuel element in cycle i, t_p and t_y the operation period of the fuel element in the reactor and the equipment, respectively, during one cycle; $t_B = t_{py} + t_{yp}$; t_{py} and t_{yp} denote the periods necessary for the transport of one fuel element from the reactor to the equipment and vice versa; n denotes the number of cycles. The authors also introduce a parameter, namely the coefficient of the loss of the γ-radiation energy of fission fragments in the equipment:

$$\eta_\gamma = \sum_{i=1}^{n} E_i^y \Big/ \sum_{i=1}^{n} E_i^B = (t_p, t_y, t_B, n) \quad (2),$$ where E_i^B denotes the

γ-radiation energy of the fission fragments released in the whole equipment body in cycle i. In Ref. 10 it is proven that during the circulation of fuel elements not completely burned out, $\bar{P}$ can be increased by a multiple as compared to the burned out fuel elements used

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only once. The maximum value of $\bar{P}$ is reached at $t_y = t_p$. In some cases, however, the ratio $t_y > t_p$ may be more suitable. From their calculations, the authors conclude that t_p should be as small as possible for the ranges of the values t_p, t_y/t_p, t_B/t_p. According to the authors, the results obtained in the present paper may be used for the calculation of any radiation equipment in which fuel elements of nuclear reactors operated with thermal neutrons, are used as source of γ-radiation. The authors thank M. G. Yefimov for discussing the paper, and S. I. Berestetskaya for drawing the diagrams. There are 3 figures, 4 tables, and 12 references: 7 Soviet, 1 US, 1 British, and 2 Polish.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov). Moskovskiy institut khimicheskogo mashinostroyeniya (Moscow Institute of Chemical Machinery)

The Effective Utilization of Fuel Elements of Nuclear Reactors as Sources of γ-Radiation in Radiochemical Equipment

S/020/61/136/003/026/027
B016/B052

PRESENTED: July 29, 1960, by V. A. Kargin, Academician

SUBMITTED: July 11, 1960

Card 4/4

YERMOL'YEVA, Z.V.; POCHAPINSKIY, V.I.; BREGER, A.Kh.

Radiation sterilization of antibiotic preparations. Report No.2. Basic premises for utilization of nuclear radiations in sterilizing antibiotics. Selection of radiation sources and study objects. Antibiotiki 6 no.10:904-908 O '61. (MIRA 14:12)

1. TSentral'nyy institut usovershenstvovaniya vrachey, Vsesoyuznyy nauchno-issledovatel'skiy institut antibiotikov i Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni L.Ya.Karpova.
(ANTIBIOTICS) (RADIATION STERILIZATION)

BREGER, A.Kh

137

PHASE I BOOK EXPLOITATION SOV/5486

Vsesoyuznoye soveshchaniye po vnedreniyu radioaktivnykh izotopov i yadernykh izlucheniy v narodnoye khozyaystvo SSSR. Riga, 1960.

Radioaktivnyye izotopy i yadernyye izlucheniya v narodnom khozyaystve SSSR; trudy soveshchaniya v 4 tomakh. t. 1: Obshchiye voprosy primeneniya izotopov, pribory s istochnikami radioaktivnykh izlucheniy, radiatsionnaya khimiya, khimicheskaya i neftepererabatyvayushchaya promyshlennost' (Radioactive Isotopes and Nuclear Radiations in the National Economy of the USSR; Transactions of the Symposium in 4 Volumes. v. 1: General Problems in the Utilization of Isotopes; Instruments With Sources of Radioactive Radiation; Radiation Chemistry; the Chemical and Petroleum-Refining Industry) Moscow, Gostoptekhizdat, 1961. 340 p. 4,140 copies printed.

Sponsoring Agency: Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov SSSR, and Gosudarstvennyy komitet Soveta Ministrov SSSR po ispol'zovaniyu atomnoy energii.

Ed. (Title page): N.A. Petrov, L.I. Petrenko and P.S. Savitskiy; Eds. of this Vol.: L.I. Petrenko, P.S. Savitskiy, V.I. Sinitsin, Ya. M. Kolotyrkin, N.P. Syrkus and R.F. Romm; Executive Eds.: Ye. S. Levina and B. F. Titskaya; Tech. Ed.: E.A. Mukhina.

Card 1/12

Radioactive Isotopes (Cont.) SOV/5486

PURPOSE: The book is intended for technical personnel concerned with problems of application of radioactive isotopes and nuclear radiation in all branches of the Soviet economy.

COVERAGE: An All-Union Conference on problems in the introduction of radioactive isotopes and nuclear radiation into the national economy of the Soviet Union took place in Riga on 12-16 April 1960. The Conference was sponsored by: the Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov SSSR (State Scientific and Technical Committee of the Council of Ministers, USSR); Glavnoye upravleniye po ispol'zovaniyu atomnoy energii pri Sovete Ministrov SSSR (Main Administration for the Utilization of Atomic Energy of the Council of Ministers, USSR); Academy of Sciences, USSR; Gosplan USSR; Gosudarstvennyy komitet Soveta Ministrov SSSR po avtomatizatsii i mashinostroyeniyu (State Committee of the Council of Ministers, USSR, for Automation and Machine Building) and the Council of Ministers of the Latvian SSR. The transactions of this Conference are published in four volumes. Volume I contains articles on the following subjects: the general problems of the Conference topics; the state and prospects of development of radiation chemistry; and results and prospects of applying radioactive isotopes and nuclear radiation in the petroleum refining and chemical industries. Problems of designing and manufacturing instruments which contain sources of radioactive radiation and are used for checking and automation of technological processes are examined, along with problems of accident prevention in their use. No personalities are mentioned. References accompany some of the articles.

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RADIATION CHEMISTRY

Radioactive Isotopes (Cont.) SOV/5486

Card 9/12

BREGER, A. KH.

PHASE I BOOK EXPLOITATION SOV/6176

Konobeyevskiy, S. T., Corresponding Member, Academy of Sciences USSR, Resp. Ed.

Deystviye vadernykh izlucheniy na materialy (The Effect of Nuclear Radiation on Materials). Moscow, Izd-vo AN SSSR, 1962. 383 p. Errata slip inserted. 4000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye tekhnicheskikh nauk; Otdeleniye fiziko-matematicheskikh nauk.

Resp. Ed.: S. T. Konobeyevskiy; Deputy Resp. Ed.: S. A. Adasinskiy; Editorial Board: P. L. Gruzin, G. V. Kurdyumov, B. M. Levitskiy, V. S. Lyashenko (Deceased), Yu. A. Martynyuk, Yu. I. Pokrovskiy, and N. F. Pravdyuk; Ed. of Publishing House: M. G. Makarenko; Tech. Eds: T. V. Polyakova and I. N. Dorokhina.

Card 1/14

The Effect of Nuclear Radiation (Cont.)

PURPOSE: This book is intended for personnel concerned with nuclear materials.

COVERAGE: This is a collection of papers presented at the Moscow Conference on the Effect of Nuclear Radiation on Materials, held December 6-10, 1960. The material reflects certain trends in the work being conducted in the Soviet scientific research orginization. Some of the papers are devoted to the experimental study of the effect of neutron irradiation on reactor materials (steel, ferrous alloys, molybdenum, avial, graphite, and nichromes). Others deal with the theory of neutron irradiation effects (physico-chemical transformations, relaxation of internal stresses, internal friction) and changes in the structure and properties of various crystals. Special attention is given to the effect of intense γ-radiation on the electrical, magnetic, and optical properties of metals, dielectrics, and semiconductors.

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The Effect of Nuclear Radiation (Cont.)

Card 6/14

POCHAPINSKIY, V.I.; YERMOL'YEVA, Z.V.; BREGER, A.Kh.

Radiation sterilization of antibiotic preparations. Antibiotiki 7 no.9:786-789 S '62. (MIRA 15:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut antibiotikov (for Pochapinskiy, Yermol'yeva). 2. Fiziko-khimicheskiy institut imeni L.Ya.Karpova.
(RADIATION STERILIZATION)(ANTIBIOTICS--STERILIZATION)

KHOMUTOV, R.M.; KARPEYSKIY, M.Ya.; BREGER, M.A.; SEVERIN, Ye.S.

On some analogues of cycloserine with antitubercular effect. Vop. med. khim. 8 no.4:389-391 Jl-Ag '62.

(MIRA 17:11)

1. Laboratoriya khimicheskikh osnov biologicheskogo kataliza Instituta radiatsionnoy i fiziko-khimicheskoy biologii AN SSSR i otdela khimioterapii Instituta farmakologii i khimioterapii AMN SSSR, Moskva.

S/138/62/000/012/009/010
A051/A126

AUTHORS: Khozak, V. K., Vaynshteyn, B. I., Breger, A. Kh., Kaplunov, M. Ya., Syrkus, N. P.

TITLE: Calculations of a radio-chemical equipment emitter for tire vulcanization using gamma radiation of spent heat-emitting sectors from a nuclear energy reactor

PERIODICAL: Kauchuk i rezina, no. 12, 1962, 26 - 29

TEXT: Physical calculations were carried out on an emitter for radio-vulcanization of tires, using as the gamma source spent heat-emitting sectors, TBC (TVS), of a nuclear energy reactor. The efficiency coefficient (e.c.) of the γ-emitter is about 1% (at self-absorption in TVS - 60%). The use of various heat-emitting elements instead of TVS increases the equipment output by about 5 times. Using the TVS as the gamma source, which is the "waste product" of the reactor, increases the economic efficiency of the nuclear energy reactor. The calculations are based on the use of the TVS in the nuclear energy reactor with a thermal power of 760 Mw. The emitter chosen consisted of surfaces composed

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of TVS. Over a period of 180 days, the average activity of the emitter was found to be $\sim 10^7$ g·equiv. radium. Mathematical calculations showed that at a permissible non-uniformity of the field of dosages of +15%, the ratio of the average absorbed dosage for the characteristic points to the lowest dosage absorbed is $\frac{D_{aver}}{D_{min}} = 1.10 \div 1.15$. The average power of the absorbed dosage during the working time of one series of TVS (180 days) was found to be 170 rad/sec. Calculations using heat-emitting elements as gamma source formed in the disassembly of the TVS showed that in this case the e.c. for gamma emission can be increased by about 5 times which is explained by the considerable drop on the self-absorption of the gamma-emitting sources. There are 5 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Research Institute of the Tire Industry and Scientific and Research Physico-Chemical Institute, im. L. Ya. Karpov)

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206820016-6"

BREGER, A.Kh.; RYABUKHIN, Yu.S.; TUL'KES, S.G.; VOLKOV, Ye.N.

Indium-gallium circulation loop of an IRT nuclear reactor.
Trudy Inst.fiz.AN Gruz.SSR 8:51-58 '62. (MIRA 16:2)
(Nuclear reactors)

RYABUKHIN, Yu.S.; BREGER, A.Kh.

"Radiation" type nuclear reactors. Trudy Inst.fiz.AN Gruz.SSR 8:59-62 '62. (MIRA 16:2)
(Nuclear reactors)

ZAKHAROV, Yu.A.; BOLDYREV, V.V.; LYKHIN, V.M.; VOTINOVA, L.A.; SAVEL'YEV, G.G.; BREGER, A.Kh.

Study of the effect of preliminary irradiation on the thermal degradation of silver oxalate containing cadmium admixture. Dokl.AN SSSR 145 no.1:122-124 Jl '62. (MIRA 15:7)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki, elektroniki i avtomatiki pri Tomskom politekhnicheskom institute imeni S.M.Kirova i Fiziko-khimicheskiy institut imeni L.Ya.Karpova. Predstavleno akademikom M.M.Dubininym.

(Silver oxalate) (Cadmium) (Radiation)

VAYNSHTEYN, B.I.; BREGER, A.Kh.; SYRKUS, N.P.

Spent fuel elements as sources of gamma rays in radiochemical apparatus. Khim.prom. no.9:651-652 S '62. (MIRA 15:11)
(Gamma rays) (Radiochemistry)